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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/631,999

07/30/2003

Viatcheslav V. Osipov

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12/29/2005

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EXAMINER

TOLEDO, FERNANDO L

ART UNIT

PAPER NUMBER

2823

DATE MAILED: 12/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/631,999

Applicant(s)

OSIPOV ET AL.

Examiner

Fernando L. Toledo

Art Unit

2823

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 October 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 – 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Sankar Das Sarma (Spintronics).

2. In re claim 1, Sankar discloses in the article “Spintronics”, pages 516 – 523 a first magnetic region (emitter); a second magnetic region (collector); a control region (channel) that forms a first interface with the first magnetic region; and a wire (gate) relative to the control region (channel) so that a current through the wire creates in the control region a magnetic field that rotates spins of the electron traversing the control region (Figure 1).

3. In re claims 2 and 13, Sankar discloses wherein the control region is such that an electron spin relaxation time of the control region is longer than a transit time of the electrons traversing control region (Figure 3 and column 3, page 518).

4. In re claims 3 and 14, Sankar discloses wherein the control region includes a semiconductor material (column 2, page 518).

5. In re claims 4 and 15, Sankar discloses wherein the semiconductor material is selected from a group consisting of Si, Ge, GaAs, InAs, GaP, GaInAs, ZnSe and ZnCdSe (column 2, page 518).

6. In re claims 5 and 16, Sankar discloses wherein the semiconductor material is n-type (Figure 5).

7. In re claims 6, 17 and 18, Sankar discloses wherein each of the first and second magnetic regions includes a ferromagnetic material (column 2, page 518).

8. In re claims 7 and 19, Sankar discloses wherein the first magnetic region has a first magnetization, the second magnetic region has a second magnetization, and the first and second magnetizations are fixed at a relative angle selected to give the device a desired electrical characteristic (column 3, page 518).

9. In re claims 8 and 20, Sankar discloses further including terminals that permit biasing of the first and second magnetic regions to cause injection of spin-polarized electrons through the first interface into the control region so that the second interface acts as a spin filter with a resistance depending on spin orientation of the spin-polarized electrons in the control region, near the second interface (column 3, page 518).

10. In re claims 9 and 21, Sankar discloses wherein a bias voltage applied between the first and second magnetic regions causes injection of spin-polarized electrons through the control region between the first magnetic region and the second magnetic region (column 3, page 518).

11. In re claim 10, Sankar discloses wherein a fixed bias voltage is applied between the first and second magnetic regions, and a first current through the wire changes a second current between the first and second magnetic regions (column 3, page 518).

12. In re claim 11, Sankar does not disclose further including an insulating material disposed to electrically insulate the wire (gate) from the control region (channel), the first magnetic region (emitter) and the second magnetic region (collector). However, it is inherent to insulate the wire

Art Unit: 2823

from the other elements of the device since the absence of an insulating material electrically insulating the gate, would short circuit the device.

13. In re claim 12, Sankar discloses a magnetic wire (gate); a magnetic region (emitter) and a control region (channel) forming a first interface with the magnetic wire and a second interface with the magnetic regions, wherein: the first and second interfaces selectively permit spin-polarized electrons to cross between the magnetic wire and the magnetic region; and a current along the magnetic wire creates in the control region a magnetic field that rotates spins of the electron traversing the control region (columns 2 and 3, page 518).

Response to Arguments

14. Applicant's arguments filed 21 October 2005 have been fully considered but they are not persuasive for the following reasons.

15. Applicant contests that Sarma does not teach electron spin interacting with a magnetic field produced by a current through a wire. Examiner respectfully submits that Sarma teaches such limitation in 2nd column on page 518.

Conclusion

16. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after

Art Unit: 2823

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fernando L. Toledo whose telephone number is 571-272-1867. The examiner can normally be reached on Mon-Thu 7am to 5:30pm.

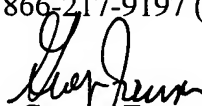
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith can be reached on 571-272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



FToledo

26 December 2005



George Fourson
Primary Examiner
Art Unit 2823